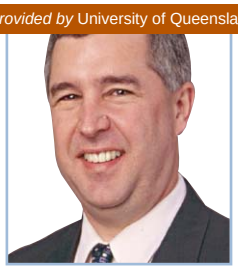

Sharps injuries in dental practice: getting the point

By Professor Laurence J. Walsh

Injuries from sharps remain a concern in contemporary dental practice because of the underlying possibility of transmission of blood-borne viruses. The estimated transmission rates for hepatitis B (HBV) to non-vaccinated recipients, hepatitis C (HCV) and human immunodeficiency virus (HIV) after a needlestick injury from a dental needle are 6-30%, 2.7-10% and 0.1-0.3% respectively.[1]

Because of the rise in HCV positive patients in the community in the past decade, this group now tends to attract greater attention. Recent (mid-2005) data for Queensland from a major pathology laboratory show that the rate of notification for HCV was 40 times higher than for HIV and HBV, respectively (2400 new HCV vs 60 new HIV and 720 HBV in 12 months). Similar trends can be seen in the nationally compiled data for the Communicable Diseases Intelligence (CDI) network over recent years.

The emphasis must therefore be on prevention, which comes down to two key factors: Firstly, workplace design and proper work practices - to reduce the likelihood of a sharps exposure; and secondly, anticipation, planning and training - to reduce the incidence of injuries and to minimize their impact, in terms of both human and fiscal costs. The latter can be very substantial following a sharps injury in the dental workplace[2], with a major contribution coming from staff absences which reduce productivity. Estimates of direct costs (which include where the source patient is negative for blood borne viruses (and thus there is no intervention required) or HIV positive (when post-exposure prophylaxis may or may not be used), including administrative and staff costs, for a 30 minute consultation and blood tests, in a recent UK report[3] are as follows (based on an exchange rate of AUD $1 = GBP 0.44):

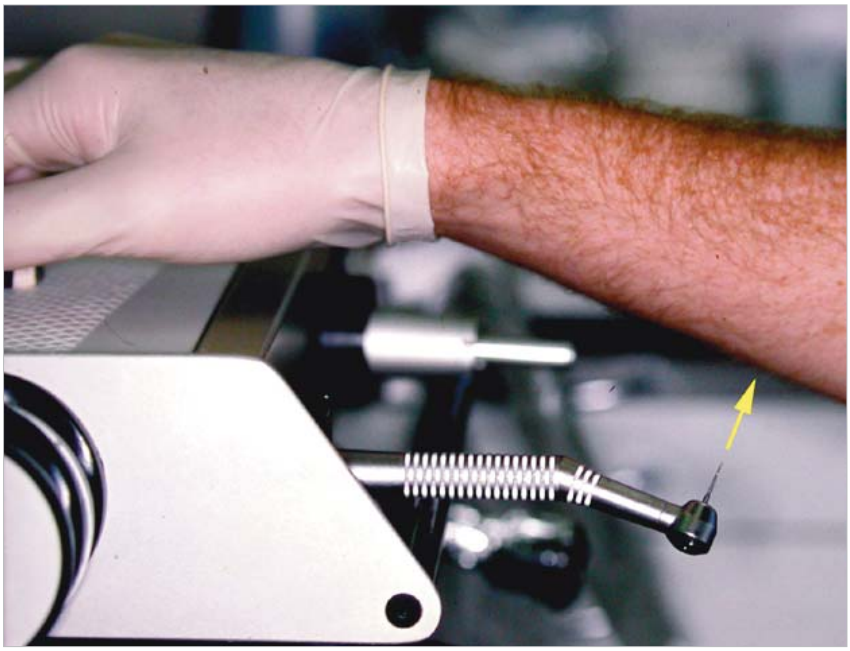

Figure 1. "Murphy's Law" states that handpieces will be positioned in cradles in a way that places the bur at greatest risk of causing a puncture injury.

- Sharps injury, no antiviral drugs required: $309
- Sharps injury, with starter pack but no further drugs: $675
- Sharps injury, full course of anti-retroviral drugs course: $4890
- As above but with absence due to illness or side effects: $8740

Australian data clearly show that the three most common causes of contaminated sharps injuries are burs left in handpieces (Figure 1) by the operator (which then cause a puncture injury in the operator or the assistant), incorrect (two-handed) needle recapping methods, and manual cleaning of probes in the sterilizing room.[2] Changes to techniques as well as to equipment would prevent such incidents.

In terms of equipment, this could mean a shift from the traditional needle/syringe unit to systems with engineered built-in safety mechanisms. The design of the traditional dental metallic cartridge syringe dates back to the 1920's[3], and other than

Figure 2. A not-so-conventional sharps injury from an uncapped LA needle. (Staged scenario, courtesy of Drs Russell MacDonald, Kevin MacGregor, and Nick Cusack).

the inclusion of an aspirating plunger, there have been few changes since that time. The design poses an inherent problem in that unless the needle is re-sheathed, there is a risk of sharps injury when dismantling the unit.[4] The literature consistently shows that it is during the

Figure 3. SafetyPlus™ system. The carbon fiber handle is the only component which is reprocessed and re-used. The lower part of the photograph shows the design of the handle, which has evolved in recent years. The latest design (right) provides a snug positive lock for cartridges of LA solution.

Figure 4. This bracket table is not yet safe for cleaning up at change-over. Syringes of endodontic irrigants should be placed directly into the sharps container located at the chairside without attempting recapping.

Figure 5 (right). Burs to be re-used are taken out of handpieces (top) and placed back into their holders ready for cleaning (bottom).

process of re-sheathing and disposing of the needles that most needle-caused sharps injuries occur. This also means that the needle has been contaminated, as it has already been used in the patient's mouth. The one handed 'scoop' technique for recapping has been promoted widely and there is objective evidence from studies in Australia[5] and elsewhere[6] that it is highly effective, even for novice users. Interestingly, local data also suggest that plastic shield-type devices for recapping, such as the Needleguard (Biosafe) may not necessarily lower the rates of sharps injury.[7] Recapping if undertaken should be followed by placing the syringe out of reach of the patient (Figure 2).

Several safety systems have been developed for use in medicine, and some specifically for dental practice. Needle-protective devices are based on the conventional syringe concept but incorporate a safety mechanism that, when activated, covers the needle tip and thus assists in the prevention of sharps injuries.[8] Design features, usability by the practitioner, and safety to the patient are important issues to consider when choosing a system.[9] Personal preference and appropriate training have a large influence on the workability of most systems.[10]

The author uses the SafetyPlus™ (Septodont) system in his own practice. This system, which does not require the re-sheathing or removal of a needle from its syringe, was evaluated extensively at the Royal London School of Medicine and Dentistry in a controlled study.[11] Avoidable needle stick injuries reduced from an average of 11.8 to 0 injuries per 1,000,000 hours worked per year, compared to a control unit who reduced their frequency from 26 to 20 injuries per 1,000,000 hours worked. The cost of safety syringes was comparable to non-disposable syringes however the reduction in the cost of managing sharps injuries was substantial. This system is now used in some departments of other dental schools around the world (including at the University of Queensland) (Figure 3).

The final point of attention relates to burs. As shown in Figure 1, operators who habitually reach across handpiece cradles to pick up instruments from their bracket table are at high risk of puncture injuries from burs. At the end of the appointment, burs should be removed from handpieces and placed into a suitable container for reprocessing (if not being discarded into the sharps container). The dental assistant must check that the operator's working area is "safe" in terms of sharps before commencing cleaning. This means looking specifically for local anaesthetic syringes and burs, as well as for endodontic files and other sharps which could penetrate the gloved hands during the cleaning up process (Figures 4 and 5).

References

1. Robinson P. Prim Dent Care. 1998; 5: 33-39.
2. McDonald RI, et al. Aust Dent J. 1997; 42: 109-113.
3. Zakrzewska JM, et al. Br Dent J. 2001; 190: 88-92.
4. Jagger J, et al. N Engl J Med. 1988; 319: 284-288.
5. Wright GD, Farrer JA. Accid Anal Prev. 1993; 25: 153-199.
6. Froom P. Am J Ind Med. 1998; 34: 15-19.
7. Whitby M, et al. Infect Control Hosp Epidemiol.1991;12: 220-225.
8. Trim JC.Br J Nurs. 2004; 13: 144-53.
9. Cuny E, et al. J Calif Dent Assoc. 1999; 27: 525-530.
10. Cuny E, et al. J Am Dent Assoc. 2000; 131: 1443-1448.
11. Zakrzewska JM, et al. Br Dent J. 2001; 190: 88-92.

Professor Laurence J. Walsh is the technology editor of Australasian Dental Practice magazine. He is also a noted commentator on and user of new technologies and is the Head of The University of Queensland School of Dentistry.